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ABSTRACT

Teaching methods are recommended for dealing with particular learning and study problems experienced by students using a format which includes a statement of the learning problem, a description of a method for dealing with that problem, correct and incorrect examples of the use of the method, and an explanation of why the method works. The problems identified include students' lack of motivation and difficulties in comprehending concepts or definitions; students' tendencies to set low or unrealistically high standards for themselves; discouragement and apathy resulting from failure or fear of failure; poor note-taking techniques; inability to apply learned skills; poor study skills or habits; and slow progress, missing essential points, and making continued mistakes. Among the methods recommended for dealing with these problems are the following: (1) state why particular information is useful; (2) alter the sequence in which information is presented so that basic skills are learned first; (3) include a statement of terminal skills or goals and the component skills which are required to reach them; (4) use positive and negative examples; (5) explain the standards for the actions required to obtain particular results; (6) clearly indicate the information that should be noted down; (7) provide students with the opportunity to systematically practice the skills to be learned; and (8) state clearly the problem to be resolved, the goal to be attained, and the benefits of attaining that goal. (HB)

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HOW TO TEACH EFFECTIVELY AND GET HIGH STUDENT ACHIEVEMENT AND MOTIVATION

by

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Introduction

This article is meant as a brief summary of some teaching methods which are supported by research and theory in social psychology and education. The presentation will be organized around common problems, a suggested method, some examples, and an explanation of why the method works. Readers should remember that there are exceptions to almost everything under some circumstances. These suggestions may not work with some students or some subject matter. But I believe you can trust these suggestions will work.

1. Problem

You describe concepts, definitions, facts, principles, proper methods of working and so on. But the students do not seem to realize their significance, do not take notes, and act bored with the lecture.

Method

Use the "Useful Empty Category" method.

You talk about a useful, desirable result that they cannot get yet. Then you say you are going to tell them something (the empty category) that will help them get it. Then you give the information.

Correct Examples

We have always wondered what proportion of U.S. income the richest 10% of the people get.
Here's the answer: 42% of it.

As future nurses you're going to need to know how to assess a person's urine to tell if the person is getting sicker or better.
Here's how. (Then tell how.)

Incorrect Examples

The richest 10% of American people receive 42% of the national income.

Here are the ways to test a person's urine.

Why It Works

The laws of memory partly make this method work. What laws? The laws that say that people associate one bit of information to another. When you announce an empty category and say that you are going to fill it, you are making the students think of that topic. Then when you give the information that fills it, you are associating two things together.

The laws of motivation also make this method work? What laws? The laws that describe how people value information more if they have wanted it and not had it. Detective story writers create a mystery for their readers, and we read on because we want the answer. You can do it, too, by creating a temporary mystery and then solving it.

Another suggestion: Tell your students to take notes on the question you asked or on the empty category as well as the answer. It'll help them.

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SEQUENCE
THE MATERIAL

Problem

You describe concepts, definitions, principles, facts, and proper methods of working. But the students do not seem to understand them. You guess that they do not understand the prerequisite skills and concepts.

Method

Rearrange the sequence by which you present material.

You want to end up with a sequence in which the students learn the simplest material first and progress to more and more complex material.

How to do it: First, define the terminal skills (the end point of knowledge or skills that you want the students to have). Second, you carefully analyze the terminal skills into component skills (the simpler knowledge and skills that students need to have in order to master the terminal skills). Third, you classify the component skills into two groups: Those concepts and skills you can teach them in your class and the other concepts and skills that are too simple for your class and which students should get in a prerequisite course.

Do you have problems sometimes when you try to figure out what are the component skills of a complex skill? You solve a problem by asking this question: "What other knowledge does a student need to understand this concept?" "What other skills does a student need in order to do this skill?"

Correct Example

I want to teach the definition of a social role. It is a collection of norms, values and beliefs that are attached to a social position. I have to pre-teach the concepts of norms, values, beliefs, social, and position. They are component skills. I will not teach words like collection or attached in my class. They are for remedial courses.

Incorrect Example

I want to teach the computer programming students how to punch FORTRAN statements onto an IBM card. I teach the FORTRAN code, but I forget they may not know how the keypunch machine works. I include the blank symbol, b, and I use it without defining it.

Why It Works

Obviously, people need to learn simple component skills before they can handle advanced complex skills.

Many teachers forget that there are simple concepts and skills that they need to teach their students. Teachers are advanced in their knowledge. Because certain skills are so simple to them, they forget that their students may not know them.

POSITIVE
EXAMPLES
&
NEGATIVE
EXAMPLES

Problem

You teach a concept or a principle or a definition. But the students cannot relate it to real-life examples. Students make mistakes in relating general ideas to specific instances. Students learn misrules despite your efforts to be clear.

Method

When you teach concepts and skills, provide the students with a set of positive examples and negative examples.

A positive example is an actual concrete example of the concept. If you were trying to teach what mammals were, you would say, "A cow is a mammal."

A negative example (or, loosely speaking, a not-example) is a concrete instance which is definitely NOT an example of the concept or skill. If you were trying to teach what mammals were, you would also say, "An alligator is not a mammal."

How do you select examples and not-examples? First, you need to note that all concepts and skilled activities have certain characteristics that are absolutely essential. If you changed those characteristics, you'd call them by another name. Second, almost all concrete examples of concepts have other characteristics that vary from example to example, but the example is still an instance of the concept. For example, consider the concept of a square. Squares must have 4 sides of equal length that are joined at right angles. Essential characteristics. But squares can be big or small, colored red or blue or black, smell good or yucky, be made of wood or tissue paper, and so on. Yet they're still squares. Irrelevant characteristics.

You select a set of positive examples that vary in their irrelevant characteristics. You don't want to fool the students into thinking that irrelevant characteristics are really essential characteristics.

You select a set of negative examples that also vary in their irrelevant characteristics. But you also choose negative examples that differ from positive examples by only one or two essential characteristics. You try to select examples that would fool students if they didn't remember the definition and the essential characteristics.

Make all positive examples possess all the essential concept characteristics. Make all negative examples possess only some or none of the essential concept characteristics.

When you show the examples and not-examples to the students, keep telling them how they possess essential characteristics or not. Force the students to perceive the relationship between the concept and examples and not-examples. Relate the abstract to the particular.

Correct Examples

"Here are some mammals: cats, cows, pigs, mice, elephants, whales, kangaroos. Here are some things that are not mammals: dinosaurs, birds, frogs, mosquitos, trees."

"When you use a saw, hold it in your right hand like this, and put your left hand on the board with your thumb curled away from the cutting edge. I remember a student who left his thumb sticking over the line. He lost it." (Then the teacher shows permissible variations.)

Incorrect Examples

"Social norms are ideas as to what people should do in certain situations. Americans have a norm that people should wait in line to buy tickets at movie theaters." (Then the teacher moves on the next concept.)

"Watch me while I spray Windex on the window and wipe it off with the cloth. This is how to do it." (Then teacher does it correctly without demonstrating mistakes or naming the essential traits involved in the skill.)

Why It Works

Presenting a set of positive and negative examples to illustrate new concepts and operations works basically because it prevents students forming false beliefs about the idea. It also works because the human memory is fast and accurate with concrete information, but slower with strings of words. It also works because people who can link new ideas to several other ideas (the examples) remember better than people who learn isolated information. Students usually can generalize from your examples to new examples they have not seen before.

ACTIONS.
RESULTS &
STANDARDS:
SELF-TESTS

The Problems

Often students set low standards for their work and do it poorly.
Some students set high unrealistic standards and get discouraged.

Many students do their work but never check it over afterward to find mistakes and correct them. They never learn from their mistakes. They are passive, and they depend on you the teacher to tell them what is right and what is wrong.

The Method

People who can do actions successfully know three things: (1) The standards for good actions; (2) How to find the results of their actions and compare them to the standards; and (3) How to correct their actions. Standards, results, actions.

Therefore, you must teach the standards, how to find the results, how to compare them to the standards, and what the correct actions are.

Here is how to teach standards: Use all normal teaching methods to describe what the ideal results would look like, sound like, feel like, etc. If a student threw a basketball correctly, what would its speed and arc look like? If a student wrote a history paper correctly, what would its parts and structure contain? If a student studied chapter 4 of your textbook successfully, how could the student tell? Use positive and negative examples in your presentation. Describe the range of acceptable variation. Describe the lower standards that are acceptable for beginners still learning!

Here is how to teach the students how to identify their results: People's actions always have results (effects, consequences). People use their eyes to watch a basketball's arc and speed. They use their knowledge of concepts like "proofs" and "general theory" to perceive the contents of a history paper. They check their memory of chapter 4 of your textbook by asking themselves questions and observing their answers. You must teach the students what senses (eyes, ears, nose, etc.) to use to detect the results of their attempts to do the new action successfully.

Then teach the students to compare the results of their actions to the standards. If they match, they should remember the action that produced the good results. If the results differ from the standards, the students should change their actions until the results do match the standards.

Here is how to teach them to do the matching or self-testing: Tell them to think of the standard and to run it through their heads. Then they look at the result as if it were an example. Ask: Does it have all the essential characteristics of the concept of the standard?

You also need to teach students how to do actions correctly. I will say no more on this topic because most teachers teach skills frequently.

Correct Examples

"Here is how to tell you, as a dental hygiene student, have cleaned the tooth completely. Rub your probe gently on the tooth. If it does not vibrate, the tooth is okay."

"Study chapter 3 until you can define the 15 words listed below, by covering them up with your hand and reciting the definition, and comparing them to the book and getting them correct."

Incorrect Examples

"Weigh your sample of soil on the balance by moving the weights." (The teacher omits telling how to observe imbalance and balanced weights. The standard is not described.)

"Study chapter 3 for tomorrow."

"Do problems 1-15."

(Comment: These assignments do not define the standards or how to test the student's results against the standards.)

Why It Works

This method works because all behavior is ruled by standards. People work up to the level of quality that their standards dictate--if they believe it is possible. If you the teacher do not define the standards, the students will define the standards by themselves. The resulting standards are often horrible.

There is a psychological principle involved; "The easier it is for people to identify when their actions have produced results that match the standards, the more likely they will work hard to correct their actions." Your job as a teacher is partly to make it easy for them. How do you make it easy? By teaching exactly what the standards for their work are, how to find the results of their actions, how to do a self-test to see if results match standards, and how to do the actions.

The goal is for you to help the students to be autonomous.

You want to set them free from dependence on you to always tell them whether their work is good or not.

You can identify when you are using this method correctly by asking yourself: "Could my students do this task, check how good a job it is afterwards by themselves, and know how to correct it by themselves?" If you can say yes, you're successful. By the way, it often takes many weeks in certain parts of courses to get students to this level.

HOW TO ENCOURAGE STUDENTS

The Problem

When students do poorly (or fear they will do poorly), they often get discouraged, feel apathetic, quit working, and drop the class. It causes you a problem. You want to set reasonably high standards and demand good work from the students, but you know that if you go too far, you'll lose students. You want to keep them encouraged--but how?

The Method

First, here is a list of things that encourage and discourage people.

Things That Are Encouraging

1. You believe the end result of your work will be rewarding and valuable to you.
2. You believe that you can put up with the cost, the pain, the effort, the time it takes to work and to learn.
3. You believe that other people and the universe will give you the just results of your work.
4. You failed and you believe that next time you can work harder or work with a different method and succeed.

Things That Are Discouraging

1. You believe that the end result of your work will be nothing, no reward, no job, nothing interesting, everything useless.
2. You believe that you cannot tolerate the high cost, extreme pain, excruciating effort, and the long time it takes to work and to learn.
3. You believe "life ain't fair". Even if you work, people and the universe won't give you credit for your work and learning.
4. You failed and you believe that your low ability or bad luck or an impossible difficult task means that next time you would fail again.

How can teachers use this knowledge about encouragement and discouragement? You talk and you do. First, you talk in such a way that you help students to believe the things that are encouraging. You also try to talk

the students out of believing the things that are discouraging. It's a battle for their minds. Second, you do things in your course that foster encouragement and which prevent discouragement. By that I mean that you set reasonable demands that are possible for students to achieve, you teach them methods of studying and practicing that permit real learning, you are very honest and fair in evaluating their work, teach things which have real useful rewards for the students.

Encouraging Teacher Actions

Discouraging Teacher Actions

****Note:** The numbers on this list match the numbers on the earlier list of encouraging and discouraging things.

- | | |
|---|--|
| 1. Teacher explains why each new concept and skill will benefit student. | 1. Teacher is bored and shows it. Teacher simply teaches topic after topic without explaining its usefulness. |
| 2. Teacher makes reasonable demands. Teacher openly tells students when it will be difficult, but tells them how soon it gets easier. | 2. Teacher makes unreasonable demands. Teacher makes students believe the hard parts will never end. Teacher never softens hard parts by explaining later rewards. |
| 3. Teacher is fair. Teacher explains standards openly and explains purpose for each assignment. | 3. Teacher is unfair: secret standards, tests are unpredictable, wastes class time, unresponsive to student questions or reasonable complaints, busy work. |
| 4. Teacher shows student in trouble how to work harder and how to switch from ineffective methods to effective ones. Teacher tells student that harder work and better student methods will lead to success. Teacher attacks negative beliefs in low ability, bad luck, high task difficulty. | 4. Teacher believes that poor students are dummies and cannot improve and communicates belief. Teacher demands more work with same methods. |

Why It Works

People tend to be encouraged if their beliefs are positive. They need to believe that their work will produce satisfying results, without too great a cost, and that if they have a failure that it is temporary and can be changed by more work with a different method. It is beliefs about the future that cause encouragement to try again. Everything a teacher says and does in a course influences a student's willingness to try hard.

HELP
STUDENTS
TAKE NOTES

The Problem

Many students take very poor notes in class. Many students lack the ability to hear several sentences and to summarize them into the main point. Many students can read well and listen well, but they cannot pick out key ideas and cannot identify the parts of a talk. Often they take notes on stories or examples and do not write down important principles, facts, rules and so on. This is a defect in reasoning ability and it seems to come from flaws in the public school system.

The Method

It is often helpful to tell the students directly: "You should write this down." Then you should either write it on the board directly in the form you want it written down in or else say it slowly and clearly. Do not say anything else while the students write.

Most teachers are horrified at the thought of being silent--like radio announcers who fear dead air time. But it works.

Correct Example

"Here is the general proposition that summarizes this research. You should put it in your notes. The more frequently people interact, the more likely they will like each other." (Then teacher pauses.)

Incorrect Example

"It has been found by researchers that the more frequently people interact, the more likely it is that they will like each other. Edward E. Jones, studying ingratiation found . . ." (Teacher goes on without stopping. No material is emphasized.)

Why It Works

This method of teachers pointing out what to take notes on works partly because it overcomes a common weakness of many students: their inability to perceive what is important and what is secondary. Do not blame the students too harshly. After all, didn't it take the pioneers in your field many years to figure out the theories and findings and skills that you now teach? It is hard for any human being to listen to a large mass of new material and to extract the central points, to write them down, while still keeping an ear open for new material.

This method also works because most teachers are not brilliant public speakers. It's not our fault. The skill is very rare. Therefore, if you directly tell the students to take notes on certain ideas you are helping to compensate for any lack of skill in speaking you might have.

There is another reason this method works that is linked to the laws of memory. People have a short-term memory for information that lasts about 15 to 20 seconds. You can state a fact in your lecture, the student can hear it and understand it, and the student's memory for that fact will fade after 15 to 20 seconds. And if you keep talking with more information, the student will think about the new information and won't recite and rehearse the first important fact, and before long it will be forgotten. The same will happen to all the information. And yet the student will have illusion that he or she understood everything in your lecture. Understood--yes. Remembered--no!

Therefore, when you pause and permit the student to write down an important fact, you are helping the student to save it before the remorseless forgetting process swallows it up.

PRACTICE AND FEEDBACK

The Problem

Many teachers can teach effectively in the sense that they communicate clearly. But often their students end up unable to use the skills they should be learning. Students of the humanities and liberal arts have difficulty in talking or writing with the new vocabulary and principles and information they are learning. And to a much lesser extent vocational students have deficient skills with the tools, machinery and procedures they are using. The problem is worse with non-vocational areas. In fact, readers of this article will have many problems using these techniques because there is no way I can provide systematic practice and feedback.

The Method

Provide systematic practice in the skills you wish to teach.

OR Teach the students how to give themselves systematic practice and make it part of their assignments.

One of the biggest obstacles teachers face in providing practice for the students is their lack of time to evaluate the work of all the students. Since they cannot give a lot of practice, they drop it and the students' learning also drops.

The cure, if it is possible in your situation, is to teach students how to give themselves practice and how to see if they can produce results which match the standards. (See p. 4 of this article.)

Many teachers require students to read books and to learn information. There often are no practical skills involved. The teacher demands memory of concepts, definitions, scientific principles, facts, theories and so on. You can provide practice on some skills by writing practice tests with true-false, multiple choice and matching items.

Here is how to write practice tests:

1. Make up lists of questions that test recognition of definitions, facts, definitions, principles and so on. Use objective formats.
2. Use answer sheets. Use either machine-scored answer sheets or answer sheets that you use a template with holes to score it with.
3. Instruct the students to answer the questions only after they study, not before. They cannot use books, but do not try to monitor.
4. Have you or an aide score the answers. It goes very fast, a few seconds per sheet.
5. Mark the wrong ones and require the students to correct them and to return for re-scoring until all are correct.
6. Do not grade the practice tests in terms of the percentage correct. Instead, give credit only when the student gets all items correct.

There are many systems of practice which vary in each field. You should also teach students how to practice in the way that works best in your field. Very often you need to teach students about practicing short parts, slow practice, mental practice, running the standard through their heads, studying their feedback, and making corrections. (See L.C.C. Testing Office Study Tip on how to practice.)

Why It Works

Practice works because the student uses the knowledge and skills as output. Without practice, the student merely has an abstract concept of the new ideas. With practice, the student attempts to use the knowledge and skill and gets a reality check. Practice makes perfect, says the old saying.

TEACH EFFECTIVE METHODS OF LEARNING

The Problem

Many students do not know how to study. No one has ever taught them how to memorize material, how to practice, how to read for information, how to take notes, how to organize material and to review it for tests, how to overcome people's normal dislike of studying, how to relax, how to conquer anxiety, how to figure out the meaning of difficult reading passages and so on. Furthermore, many students have bad study habits. They manage time poorly, they study amid distractions, they don't study enough and so on. Their poor study skills and poor study habits lead to poor learning. They will not learn well even in the presence of a great teacher.

The Method

I need say no more than teach the students some effective methods of study in your area. Try books on studying or the 15 Study Tips from the L.C.C. Testing Office.

SHOW AND TELL The Problem

OR
MODEL AND
DESCRIBE NEW
SKILLS

You give directions but the students cannot seem to put them into practice without lots of mistakes. Or you demonstrate a technique but the students seem to miss the essential points. Or you try to get students to use skills and improve skills, but their progress is painfully slow.

The Method

1. (a) Describe a problem. (b) Describe a goal. (c) Promise the students that the method to come will solve the problem, get the goal.
2. Give an attention signal.
3. Model the skill very clearly.
4. Describe each step in words so that the students hear exactly what what you did and why. Talk before, during or after depending on your situation.
5. Add some steps, as necessary and practical, where the students show and tell you back and practice the skill and receive corrections until they attain the criterion level.

Step #1 provides the motivation so the students will understand the purpose and functions of the skill.

Step #2 gets their attention. You give an attention signal by saying, "Watch my hands while I play this passage" or "Listen to the logical steps I use when I analyze this poem." Note: You command them to use a certain sense (eyes, ears, even thinking) and to focus it on a certain stimulus (your hands, your words).

Step #3 has the students watch both your actions and the results of your actions. You should demonstrate the entire sequence of (a) acting, (b) identifying the results, and (c) comparing them to the standard. You will have to talk about your process of identifying results and comparing them to the standard, because in many manual, musical, artistic, and mechanical skills, the students cannot observe your thought processes.

You should model the skill slowly, if it is possible.

You should model the skill in its separate parts, if possible.

You should use repetition in your demonstration.

If several methods are permissible, model a few of them.

You should model several obvious ways of failing so that the students can see failure and the results of bad action.

Step #4 requires you to describe what you are doing. Talk about each action. Mention the choices you have, why you avoided certain options, why you chose other options. Your goal is to have the students link words to the visual or auditory or intellectual demonstration they have witnessed. The talking about the steps is extremely important. It should come as close in time to the demonstration as practical.

Step #5 provides opportunities for the students to learn the skill by practice, correction, and improvement. The practice also permits the student to use the skill and to enjoy the rewards that come from use of the skill to solve the problems and to attain the goals that you described in Step #1.

A Good Example of Model-and-Describe Technique

1. Problem	Teacher says, "Sometimes when you use a typewriter you develop a bad habit and persistently hit the wrong letter. You want to correct the mistake. I'm going to describe a surprising method that really works to correct a habitual mistake."
Goal	
Promise	

2, 3 & 4.

2. Show & tell "Suppose I keep hitting a when I mean to type s. I should
action-- think of a few words with s in them and type the words but
result-- deliberately hit a. In other words, I make my mistake on purpose.
standard But each time I make it, I say to myself, NO, and I feel how
 wrong it is and think I don't want to do it."

Attention
signal

"Watch my fingers and listen to my voice."

Positive Ex.

Teacher types missing as miaaing and says sternly, "No!"
"The next step is to merely start toward the a when you type
an s word, but stop yourself before you get to it, say, "No!"
and consciously tell yourself to switch to s.

Teacher types essay, starts toward a, stops, says, "No!"
switches to s and types s correctly each time.

"Then when I'm done, I look at the word with s in it, and
I see it's right. I've made the result match the standard.
I feel good about it."

Negative Ex.
Practice

Teacher shows and tells common mistakes in the correction
technique and assigns practice to the students.

Some Bad Examples of Model-and-Describe Technique

1. I had a piano teacher who assigned me new music which I had never heard. I asked her to play it for me so I could hear what it should sound like. She refused, saying she didn't want me to be limited by her one way of playing. But her refusal caused me to be very slow to sense the melody and to shape the phrases. She made me play and then criticized my playing.

2. I have had many English and Social Science teachers who assigned reading to the students, then during class asked questions of the students. The teachers attempted to build an analysis of the reading and to get some critical thinking. Yet only a few teachers modelled-and-described the skills. Few teachers would analyze a poem, then say, "Did you notice the steps I followed? Here they are." Few teachers took an article, read parts in front of us, extracted key points, then explained to us how they found the key points.

Why It Works

Modelling and describing a technique simultaneously provide the students with a large amount of data to understand a new technique. They both observe a concrete model and they hear an abstract verbal description. This double input links both the left-brain and the right-brain functions of learning.

It also vividly teaches them what the standard for the action and its results is. They have a vivid image to use when they make their first fumbling attempts to learn the new skill.

If the teacher provides both positive and negative examples, it saves the students time and prevents many early mistakes.

It convinces the students that the technique is possible, is real, is workable. It convinces the students that the teacher has ability and is a worthy leader. Consequently, the students have more respect for the teacher and are more willing to learn.

It saves the teacher time in presenting a new technique. It requires the teacher to define exactly what technique is being taught, even if it is a mental skill of analysis or synthesis. The teacher teaches to the point and does not wander around the subject.

When the teacher has the time in the curriculum to require the students to show and tell back, to practice, to work up the criterion level of skill, then this method provides a complete cycle of teaching. It has a high probability of being successful.

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